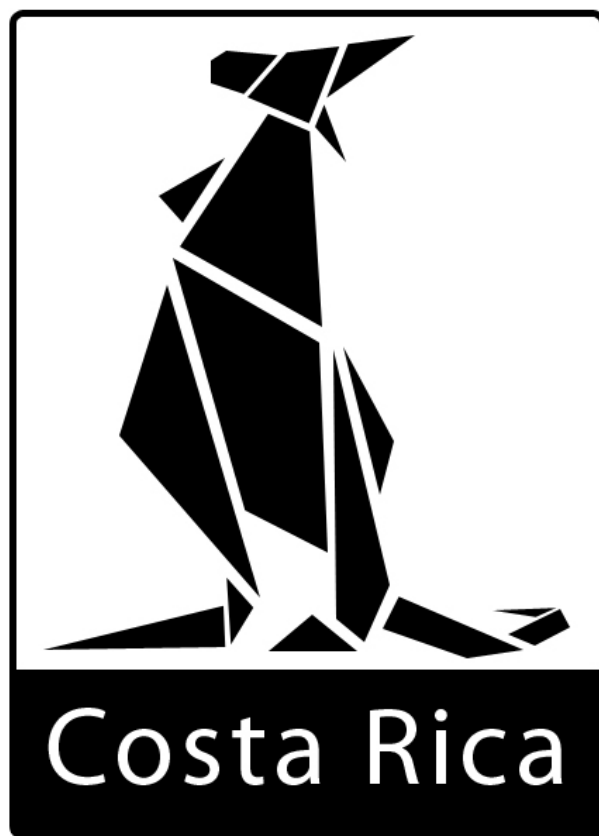


Kangourou Sans Frontières



Junior Test
Ninth Grade

Name: _____

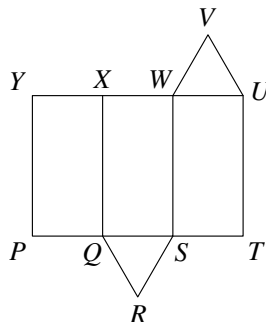
Costa Rica 2015

3 points

1. Which of the following numbers is closest to 20.15×51.02 ?

- (A) 100 (B) 1000 (C) 10000 (D) 100000 (E) 1000000

2. The diagram shows the net of a triangular prism. Which edge coincides with edge UV when the net is folded to make the prism?

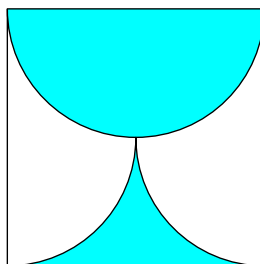


- (A) WV (B) XW (C) XY (D) QR (E) RS

3. Mother did the laundry and hanged t-shirts in line on a clothing line. Then she asked her children to put a single sock between any two t-shirts. Now there are 29 clothes on the clothing line. How many t-shirts are there?

- (A) 10 (B) 11 (C) 13 (D) 14 (E) 15

4. The shaded part of the square with side a is bounded by a semicircle and two quarter arcs. What is its area?



- (A) $\frac{\pi a^2}{8}$ (B) $\frac{a^2}{2}$ (C) $\frac{\pi a^2}{2}$ (D) $\frac{a^2}{4}$ (E) $\frac{\pi a^2}{4}$

5. In a class, no two boys were born on the same day of the week and no two girls were born in the same month. Were a new boy or a new girl to join this class, one of these two conditions would no longer be true. How many children are there in the class?

- (A) 18 (B) 19 (C) 20 (D) 24 (E) 25

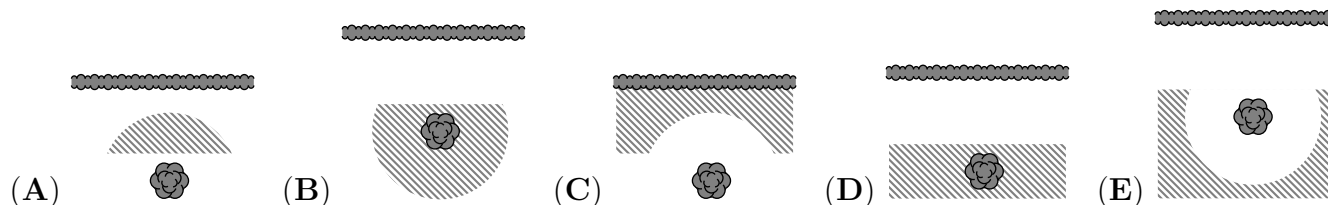
6. Three sisters, Ann, Beth and Cindy, bought a bag of 30 cookies; each received 10 cookies. However Ann paid 80 cents, Beth 50 and Cindy 20. If they had divided the cookies proportionally to the price each paid, how many more cookies should Ann have received?

- (A) 10 (B) 9 (C) 8 (D) 7 (E) 6

7. Every asterisk in the equation $2 * 0 * 1 * 5 * 2 * 0 * 1 * 5 * 2 * 0 * 1 * 5 = 0$ is to be replaced with either $+$ or $-$ so that the equation is correct. What is the smallest number of asterisks that must be replaced with $+$?

- (A) 1 (B) 2 (C) 3 (D) 4 (E) 5

8. Mister Hide wants to dig up a treasure that he buried in his garden years ago. He only remembers that he buried the treasure at least 5 m away from the hedge and at most 5 m away from the trunk of the old pear tree. Which of the following pictures shows the region where Mister Hide should look for the treasure?



9. What is the unit digit of the number $2015^2 + 2015^0 + 2015^1 + 2015^5$?

- (A) 1 (B) 5 (C) 6 (D) 7 (E) 9

10. There are 33 children in a class. Their most favourite subjects are computer studies and physical education (PE). Three children like both subjects. There are twice as many children who like only computer studies than those who like only PE. How many children like computer studies?

- (A) 15 (B) 18 (C) 20 (D) 22 (E) 23

4 points

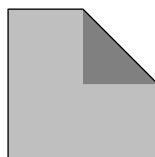
11. During a rainstorm, 15 litres of water fell per square metre. By how much did the water level rise in an open-air pool?

- (A) 150 cm (B) 0.15 cm (C) 15 cm (D) 1.5 cm
(E) It depends upon the size of the pool.

12. Which of the following is neither a square number nor a cube number?

- (A) 6^{13} (B) 5^{12} (C) 4^{11} (D) 3^{10} (E) 2^9

13. One corner of a square is folded to its centre to form an irregular pentagon. The areas of the pentagon and of the square are consecutive integers. What is the area of the square?



- (A) 2 (B) 4 (C) 8 (D) 16 (E) 32

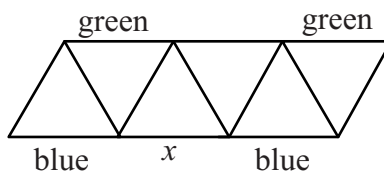
14. Mr Candle bought 100 candles. He burns one candle every day and always makes one new from the wax of seven burnt candles. After how many days will he have to go and buy new candles again?

- (A) 112 (B) 114 (C) 115 (D) 116 (E) 117

15. The number of right angles in some convex pentagon is n . Which is the complete list of the possible values of n ?

- (A) 1, 2, 3 (B) 0, 1, 2, 3, 4 (C) 0, 1, 2, 3 (D) 0, 1, 2 (E) 1, 2

16. The diagram indicates the colours of some unit segments of a pattern. Luis wants to colour each remaining unit segment in the pattern either red or blue or green. Each triangle must have one side of every colour. What colour can he use for the segment marked x ?

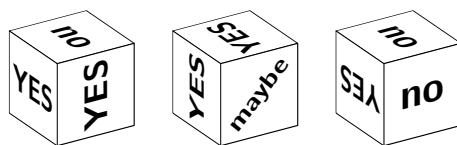


- (A) only green (B) only red (C) only blue
 (D) either red or blue (E) The task is impossible.

17. Irina asked five of her students how many of the five of them had studied the day before. Pol said none, Berta said only one, Ona said exactly two, Eugeni said exactly three and Gerard said exactly four. Irina knew that those students who had not studied were not telling the truth, but those who had studied were telling the truth. How many of these students had studied the day before?

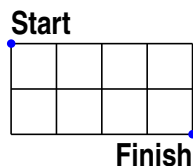
- (A) 0 (B) 1 (C) 2 (D) 3 (E) 4

18. The picture shows my decision die in three different positions. What is the probability to roll YES with this die?



- (A) $\frac{1}{3}$ (B) $\frac{1}{2}$ (C) $\frac{5}{9}$ (D) $\frac{2}{3}$ (E) $\frac{5}{6}$

19. The length of a side of one square is 1. What is the minimum distance you walk from “Start” to “Finish”, if we can only move along the sides or diagonals of individual squares?



- (A) $2\sqrt{5}$ (B) $\sqrt{10} + \sqrt{2}$ (C) $2 + 2\sqrt{2}$ (D) $4\sqrt{2}$ (E) 6

20. Every inhabitant of the Winger planet has at least two ears. Three inhabitants named Imi, Dimi and Trimi met in a crater. Imi said: “I can see 8 ears.” Dimi: “I can see 7 ears.” Trimi: “That’s strange, I can see only five ears.” None of them could see his own ears. How many ears does Trimi have?

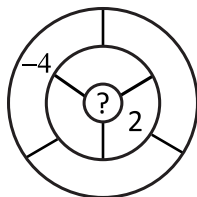
- (A) 2 (B) 4 (C) 5 (D) 6 (E) 7

5 points

21. A recipient with the form of a rectangular prism and whose basis is a square of side 10 cm, is filled with water up to a height of h cm. A solid cube of 2 cm of edge is put in it. The minimal value of h such that the cube keep full submerged in the water is:

- (A) 1.92 cm (B) 1.93 cm (C) 1.90 cm (D) 1.91 cm (E) 1.94 cm

22. Ria wants to write a number in each of the seven bounded regions in the diagram. Two regions are neighbours if they share part of their boundary. The number in each region is to be the sum of the numbers in all its neighbours. Ria has already written in two of the numbers, as shown. What number must she write in the central region?

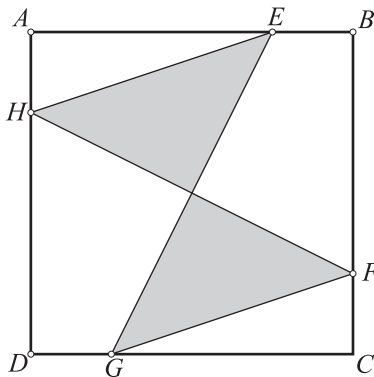


- (A) 1 (B) -2 (C) 6 (D) -4 (E) 0

23. Five positive integers (not necessarily all different) are written on five cards. Peter calculates the sum of the numbers on every pair of cards. He obtains only three different totals, 57, 70, and 83. What is the largest integer on any card?

- (A) 35 (B) 42 (C) 48 (D) 53 (E) 82

24. The square $ABCD$ has area 80. Points E , F , G and H are on the sides of the square and $AE = BF = CG = DH$. If $AE = 3EB$, what is the shadowed area?

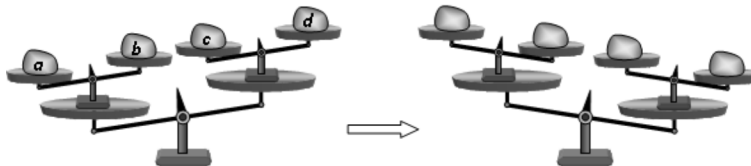


- (A) 20 (B) 25 (C) 30 (D) 35 (E) 40

25. Today the product of the ages (in integers) of father and son is 2015. What is the difference of their ages?

- (A) 26 (B) 29 (C) 31 (D) 34 (E) 36

26. Four loads a, b, c, d are placed in the scales (see fig.). Then some two of the loads were interchanged and the scales change the position as shown in the figure. Which loads were interchanged?



- (A) a and b (B) b and d (C) b and c (D) a and d (E) a and c

27. If the two roots of the equation $x^2 - 85x + c = 0$ are prime numbers, what is the value of the sum of the digits of c ?

- (A) 12 (B) 13 (C) 14 (D) 15 (E) 21

28. How many three-digit positive integers are there in which any two adjacent digits differ by 3?

- (A) 12 (B) 14 (C) 16 (D) 20 (E) 27

29. Which of the following is a counter-example to the statement ‘If n is prime then exactly one of $n - 2$ and $n + 2$ is prime’?

- (A) $n = 11$ (B) $n = 19$ (C) $n = 21$ (D) $n = 29$ (E) $n = 37$

30. Petra has three different dictionaries, and two different novels on a shelf. How many ways are there to arrange the books if she wants to keep the dictionaries together and the novels together?

- (A) 12 (B) 24 (C) 30 (D) 60 (E) 120



Answers

Name: _____

Institution: _____

Grade: _____

01. A B C D E

02. A B C D E

03. A B C D E

04. A B C D E

05. A B C D E

06. A B C D E

07. A B C D E

08. A B C D E

09. A B C D E

10. A B C D E

11. A B C D E

12. A B C D E

13. A B C D E

14. A B C D E

15. A B C D E

16. A B C D E

17. A B C D E

18. A B C D E

19. A B C D E

20. A B C D E

21. A B C D E

22. A B C D E

23. A B C D E

24. A B C D E

25. A B C D E

26. A B C D E

27. A B C D E

28. A B C D E

29. A B C D E

30. A B C D E